

What is claimed is:

1. An inverter system for driving a poly-phase motor,  
the system comprising:

5 an alternating current motor which is driven by an  
inverter for outputting drive force or generating power;

a power supply connected to a neutral point of the  
alternating current motor; and

neutral point state detecting means for detecting a state  
10 of current or voltage at the neutral point,

wherein abnormality determination is performed based on  
the detection result of the neutral point state detecting  
means.

15 2. An inverter system according to claim 1, wherein  
the neutral point state detecting means detects ripples of  
voltage at the neutral point.

3. An inverter system according to claim 1 or 2, wherein  
20 an auxiliary electrical device that consumes electrical  
power is connected to the power supply, and  
the neutral point state detecting means detects ripples of  
current supplied to the auxiliary electrical device.

25 4. An inverter system according to claim 2 or 3, wherein

abnormality is determined when the ripples detected by the neutral point state detecting means are equal to or greater than a predetermined value.

5           5.    An inverter system according to any one of claims 1 to 4, wherein

          a reactor is connected between the neutral point and the power supply, and

          the neutral point state detecting means detects a state of  
10   current or voltage on the side of the power supply with respect to the reactor.

          6.    An abnormality detecting method in an inverter system for driving a poly-phase motor comprising an alternating  
15   current motor which is driven by an inverter and generates power, and a power supply connected to a neutral point of the alternating current motor, wherein

          a state of current or voltage at the neutral point is detected, and abnormality determination is performed based on  
20   the detection result.

          7.    An abnormality detecting program in an inverter system for driving a poly-phase motor comprising an alternating current motor which is driven by an inverter and generates  
25   power, a power supply connected to a neutral point of the alternating current motor, and an abnormality detecting

apparatus for monitoring current or voltage of the neutral point, wherein

the abnormality detecting program causes the abnormality detecting apparatus to capture a state of current or voltage at the neutral point and perform abnormality determination based on the captured state.

8. An inverter system for driving a poly-phase motor, an abnormality detecting method for the poly-phase motor driving inverter system or an abnormality detecting program for the poly-phase motor driving inverter system according to any one of claims 1 to 7, wherein

the alternating current motor is an alternating current motor used for a vehicle.

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9. An inverter system for driving a poly-phase motor comprising an alternating current motor which is driven by an inverter for outputting drive force and generating power and a power supply connected to a neutral point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying electrical power to a plurality of electrical devices, the inverter system comprising:

power supply line voltage detecting means for detecting voltage on a power supply line to which the power supply is connected; and

power supply current detecting means for detecting current of the power supply, wherein

during normal operation, the inverter is controlled in accordance with an output of the power supply line voltage

5 detecting means, and

when it is determined that the power supply line voltage detecting means is operating abnormally, the inverter is controlled in accordance with an output of the power supply current detecting means.

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10. An inverter system according to claim 9, wherein

in the event of an abnormality in the power supply line voltage detecting means, control is performed such that the power supply current becomes 0 in accordance with the output of

15 the power supply current detecting means.

11. An inverter system for driving a poly-phase motor comprising an alternating current motor which is driven by an inverter for outputting drive force and generating power and a

20 power supply connected to a neutral point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying electrical power to a plurality of electrical devices, the inverter system comprising:

power supply line voltage detecting means for detecting voltage on a power supply line to which the power supply is connected; and

neutral point current detecting means for detecting

5 neutral point current which is input and output with respect to the neutral point of the alternating current motor, wherein

during normal operation, the inverter is controlled in accordance with an output of the power supply line voltage detecting means, and

10 when the power supply line voltage detecting means is operating abnormally, the inverter is controlled in accordance with an output of the neutral point current detecting means.

12. An inverter system according to claim 11, wherein  
15 the neutral point current detecting means detects current of each of three phases of the alternating current motor, and detects the neutral point current based on the detected values.

13. An inverter system for driving a poly-phase motor  
20 comprising an alternating current motor which is driven by an inverter for outputting drive force and generating power and a power supply connected to a neutral point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying  
25 electrical power to a plurality of electrical devices, the inverter system comprising:

power supply line voltage detecting means for detecting voltage on a power supply line to which the power supply is connected, and wherein

during normal operation, the inverter is controlled in  
5 accordance with an output of the power supply line voltage detecting means, and

when the power supply line voltage detecting means is operating abnormally, the inverter is controlled in accordance with a neutral point voltage command corresponding to a target  
10 voltage of the power supply.

14. An inverter system according to claim 13, wherein the neutral point voltage command is corrected base on at least one of revolution of the alternating current motor, an  
15 output torque command, and inverter input side voltage.

15. A control method of an inverter system for driving a poly-phase motor comprising an alternating current motor which is driven by an inverter for outputting drive force and  
20 generating power and a power supply connected to a neutral point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying electrical power to a plurality of electrical devices, wherein

during normal operation, the inverter is controlled in accordance with voltage of a power supply line to which the power supply is connected, and

in the event of abnormality in sensing of the power  
5 supply line voltage, the inverter is controlled in accordance with current of the power supply.

16. A control method of an inverter system for driving a poly-phase motor comprising an alternating current motor which  
10 is driven by an inverter for outputting drive force and generating power and a power supply connected to a neutral point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying electrical power to a plurality of electrical  
15 devices, wherein

during normal operation, the inverter is controlled in accordance with voltage of a power supply line to which the power supply is connected, and

in the event of abnormality in sensing of the power supply  
20 line voltage, the inverter is controlled in accordance with current of the neutral point.

17. A control method of an inverter system for driving a poly-phase motor comprising an alternating current motor which  
25 is driven by an inverter for outputting drive force and generating power and a power supply connected to a neutral

point of the alternating current motor, the power supply being charged by power generated by the alternating current motor and supplying electrical power to a plurality of electrical devices, wherein

5           during normal operation, the inverter is controlled in accordance with voltage of the power supply line, and

          in the event of abnormality in sensing of the power supply line voltage, the inverter is controlled in accordance with a neutral point voltage command corresponding to a target voltage  
10   of the power supply.

18. A control program of an inverter system for driving a poly-phase motor, the control program causing a system to perform a control method of a poly-phase motor driving inverter  
15   system according to any one of claims 15 to 17.

19. An inverter system for driving a poly-phase motor, an abnormality detecting method for the poly-phase motor driving inverter system or an abnormality detecting program for the  
20   poly-phase motor driving inverter system according to any one of claims 9 to 18, wherein

          the alternating current motor is an alternating current motor used for a vehicle.

25           20. An inverter system for driving a poly-phase motor, comprising a high voltage power supply, an inverter with the



high voltage power supply being connected to an input side and with an alternating current motor being connected to an output side, and a low voltage power supply connected to a neutral point of the alternating current motor, the inverter system  
5 controlling driving of the alternating current motor and transfer of electrical power between the high voltage power supply and the low voltage power supply by controlling driving of the inverter, wherein

switching of the inverter is performed by controlling the  
10 switching on and off of a switching element of the inverter based on a gate signal obtained from comparison between a voltage command which is sinusoidal wave and carrier, and

the voltage command which is sinusoidal wave is limited within a predetermined range with regard to the carrier  
15 amplitude.

21. An inverter system for driving a poly-phase motor comprising a high voltage power supply, an inverter with the high voltage power supply being connected to an input side and  
20 with an alternating current motor being connected to an output side, and a low voltage power supply connected to a neutral point of the alternating current motor, the inverter system controlling driving of the alternating current motor and transfer of electrical power between the high voltage power  
25 supply and the low voltage power supply by controlling driving of the inverter, wherein

driving control of the alternating current motor includes at least a stop mode and a power generation mode, and

a feed-forward element is included in a neutral point voltage command in a transition state of these modes.

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22. A control method of an inverter system for driving a poly-phase motor comprising a high voltage power supply, an inverter having the high voltage power supply connected to an input side and having an alternating current motor connected to an output side, and a low voltage power supply connected to a neutral point of the alternating current motor, in which driving of the alternating current motor and transfer of electrical power between the high voltage power supply and the low voltage power supply is controlled by controlling driving of the inverter, wherein

switching of the inverter is performed by controlling on and off of switching element of the inverter based on a gate signal obtained from comparison between a voltage command which is sinusoidal wave and carrier, and

the voltage command which is sinusoidal wave is limited within a predetermined range with regard to the carrier amplitude.

23. A control method of an inverter system for driving a poly-phase motor comprising a high voltage power supply, an inverter with the high voltage power supply being connected to

an input side and with an alternating current motor being connected to an output side, and a low voltage power supply connected to a neutral point of the alternating current motor, in which driving of the alternating current motor and transfer  
5 of electrical power between the high voltage power supply and the low voltage power supply is controlled by controlling driving of the inverter, wherein.

driving control of the alternating current motor includes at least a stop mode and a power generation mode, and  
10 a feed-forward element is included in a neutral point voltage command in a transition state of these modes.

24. An inverter system for driving a poly-phase motor or a control method of an inverter system for driving a poly-phase  
15 motor according to any one of claims 20 to 23, wherein

the alternating current motor is an alternating current motor for a vehicle.